



RESEARCH ARTICLE.....

# Effect of crop residue based complete feed on nutrient intake and digestibility in crossbred calves

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**ABSTRACT.....** The present investigation was undertaken to study the effect of crop residue based complete feed on growth performance, nutrient digestibility in crossbred calves. Eighteen crossbred (HF x Deoni) calves of six to eighteen months were selected and distributed in three groups. In control treatment ( $T_0$ ), the sorghum straw and concentrate used separately, in  $T_1$  treatment sorghum straw and concentrate used as complete feed whereas in  $T_3$  treatment sorghum and wheat straw in equal proportion (1:1) to form complete feed. The roughages to concentrate ratio in each treatment was maintained at 60:40 proportion. The average DM intake per 100 kg body weight under  $T_0$ ,  $T_1$  and  $T_2$  treatments were 1.97, 2.00 and 2.02 kg, respectively. The digestibility for DM, CP, EE, CF and NFE under  $T_2$  treatment were  $58.64 \pm 1.96$ ,  $57.24 \pm 1.37$ ,  $53.21 \pm 1.20$ ,  $58.64 \pm 1.05$  and  $56.82 \pm 1.10$  per cent, respectively. The digestibility co-efficient for DM, CP, EE, CF and NFE were non-significant among the groups.

**KEY WORDS.....** Complete feed, Digestibility, Nutrient intake, Sorghum straw, Wheat straw

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## INTRODUCTION.....

Indian feeding system cannot be the same practiced abroad because of vast difference in feed ingredient availability as a result of scarce feed resources. The success of livestock farming is greatly dependent on the continuous assured supply of good quality balanced feeds and competitive price. In ruminants, crop residues are the staple feed whereas in non-ruminants agro industrial by products are the staple feeds which are poor in quality and poorly utilized due to high fibre content, deficient in some of the nutrients like protein, minerals and vitamins.

It is common observation in rural area that calves are not properly fed due to some reasons. The availability

of green roughages either leguminous or non-leguminous for feeding of livestock is restricted except only in certain parts of the country and hence the attempts have been made since long to develop suitable, simple, easily adaptable processing technology for improvement of poor quality roughages for feeding of all categories of livestock.

Most of the crop residues form the bulk of basal diet of livestock in our country. These crop residues have practically no protein, low energy and minerals and poor digestibility due to lignocellulose complex encapsulating the cell contents. In complete feed system, feed and fodder synonymously used as total mixed ration, through

which animal get balanced diet for better rumen microbial growth and digestion. There is increase in feed intake and utilization of nutrients needed for synthesis of body tissues and milk, reduction in wastage of feed and being practiced in developed countries (Owen, 1979).

Therefore, the present investigation was undertaken to study the effect of crop residues based complete feed on nutrient intake and digestibility of crossbred calves.

## RESEARCH METHODS.....

The present investigation was conducted at Cattle Cross Breeding Project (CCBP) in the department of Animal Husbandry and Dairy Science, Marathwada Krishi Vidyapeeth, Parbhani. Eighteen crossbred calves (HF x Deoni) of six to eighteen months of age were selected for this experimental study. Six calves under each treatment were allotted. The allotment was such that there was similarity in age and body weight among the treatments.

The sorghum straw is a staple food for animals of this region which was fed *ad lib* and required concentrates in control and sorghum straw was mixed with concentrate alone and in combination with wheat straw in equal proportion (50:50) to form the treatments as follows:

T<sub>0</sub> – Sorghum straw+Concentrate (As such separately )

T<sub>1</sub> – Sorghum straw+Concentrate to form the complete feed.

T<sub>2</sub> – Sorghum straw + Wheat straw (1:1) + Concentrate to form the complete feed.

The roughage to concentrate ratio in each treatment was maintained at 60:40 proportion. The concentrate used was the product of Maharashtra Agro Industries Development Corporation called as ‘Calf Ration’.

The experiment was conducted from 6<sup>th</sup> February 2006 to 5<sup>th</sup> May 2006. The total experimental period was of 90 days. The digestion trial was conducted twice in the whole experimental period. The DM, CP, EE and CF percentage was determined as per the procedure described by AOAC (1985). The amount of NFE was calculated by subtracting the total sum of CF, CP, EE and total ash from 100. The data collected during investigation were subjected to statistical analysis by ‘Complete Randomized Design’ as per Snedecor and Cochran (1967).

## RESEARCH FINDINGS AND ANALYSIS.....

The results obtained from the present investigation as well as relevant discussion have been summarized under the following heads :

### Chemical composition of feed stuff :

The average values of DM content (Table 1) for sorghum straw, wheat straw, concentrates, complete feed (T<sub>1</sub>) and complete feed (T<sub>2</sub>) are 90.50, 90.50, 91.80, 85.55 and 88.46 per cent, respectively. The values for CP content were 4.89, 3.57, 21.62, 12.50 and 12.27 per cent, respectively. The values for EE content were 1.21, 1.02, 6.86, 3.47 and 3.41 per cent, respectively. The values for CF content were 30.18, 35.41, 9.54, 21.95 and 23.50 per cent, respectively. The values for NFE were 56.02, 47.82, 52.86, 53.82 and 51.17 per cent, respectively. The values for total ash content were 7.70, 12.18, 9.12, 8.26 and 9.65 per cent, respectively.

### Feed intake :

The data regarding the intake of total DM, DM per 100 kg body weight, DCP, TDN and water under three different treatments were presented in Table 2. The average total dry matter intake per animal under treatment T<sub>0</sub>, T<sub>1</sub> and T<sub>2</sub> were 222.3 ± 20.40, 227.7 ± 32.16 and 237.6 ± 26.64 kg, respectively. The dry matter intake under treatment T<sub>2</sub> is superior over T<sub>0</sub> and T<sub>1</sub>, but the differences observed were statistically non-significant indicating all the three treatments feed were equally liked by the calves.

The average DM intake per 100 kg body weight under treatment T<sub>0</sub>, T<sub>1</sub> and T<sub>2</sub> were 1.97 ± 0.02, 2.00 ± 0.06 and 2.02 ± 0.02 kg, respectively. The DM intake per 100 kg body weight in treatment T<sub>2</sub> was superior over T<sub>0</sub> and T<sub>1</sub>, but the differences observed were statistically non-significant indicating all the three treatments were at par.

The daily DCP intake per animal under three different treatments T<sub>0</sub>, T<sub>1</sub> and T<sub>2</sub> were 399 ± 0.01, 401 ± 0.01 and 430 ± 0.01 g, respectively. The DCP intake under treatment T<sub>2</sub> was statistically superior over T<sub>0</sub> and T<sub>1</sub>. It is only due to associative effect of roughage and increased DM intake.

The TDN intake per animal under treatment T<sub>0</sub>, T<sub>1</sub> and T<sub>2</sub> were 1.55 ± 0.01, 1.56 ± 0.02 and 1.67 ± 0.02 kg, respectively. The TDN intake in treatment T<sub>2</sub> was statistically superior over T<sub>0</sub> and T<sub>1</sub>. It is only due to

increased DMI and associative effect of roughages, but it could not affect the body weight gain statistically.

The average daily water intake per day per animal under treatment  $T_0$ ,  $T_1$  and  $T_2$  were  $8.10 \pm 0.14$ ,  $9.70 \pm 0.14$  and  $8.50 \pm 0.12$  kg, respectively. The daily water intake per animal under treatment  $T_1$  was more over  $T_0$  and  $T_2$ .

### Nutrient digestibility :

The data regarding the digestibility of DM, CP, EE, CF and NFE of the experimental calves under three different treatments were presented in Table 3. The average dry matter digestibility under treatments  $T_0$ ,  $T_1$  and  $T_2$  were  $54.19 \pm 1.30$ ,  $56.91 \pm 1.16$  and  $58.64 \pm 1.96$  per cent, respectively. The DM digestibility under treatment  $T_2$  was superior over  $T_0$  and  $T_1$ , but the differences observed were statistically non-significant indicating that all the three treatments were at par.

The average crude protein (CP) digestibility under treatments  $T_0$ ,  $T_1$  and  $T_2$  were  $58.11 \pm 1.31$ ,  $56.73 \pm 1.15$  and  $57.24 \pm 1.37$  per cent, respectively. The CP

digestibility under treatment  $T_0$  was superior over  $T_1$  and  $T_2$ , but the differences observed were statistically non-significant indicating that all the three treatments were at par.

The ether extract digestibility (EE) in calves under treatments  $T_0$ ,  $T_1$  and  $T_2$  were  $50.06 \pm 0.34$ ,  $51.23 \pm 1.27$  and  $53.71 \pm 1.12$  per cent, respectively. The ether extract digestibility of treatment  $T_2$  was superior over  $T_0$  and  $T_1$ , but the differences observed were statistically non-significant indicating that all the three treatments were at par.

The average crude fibre (CF) digestibility under treatment  $T_0$ ,  $T_1$  and  $T_2$  were  $57.92 \pm 1.23$ ,  $56.64 \pm 1.20$  and  $58.64 \pm 1.05$  per cent, respectively. The CF digestibility in treatment  $T_2$  was superior over  $T_0$  and  $T_1$ , but the differences observed were statistically non-significant.

The NFE digestibility under treatment  $T_0$ ,  $T_1$  and  $T_2$  were  $56.61 \pm 1.30$ ,  $57.81 \pm 1.17$  and  $56.82 \pm 1.10$  per cent, respectively. The NFE digestibility in treatment  $T_1$  was superior over  $T_0$  and  $T_2$ , but the differences observed

**Table 1 : Chemical composition of feed stuff (% on DM basis)**

Particulars	Sorghum straw	Wheat straw	Concentrates	( $T_1$ )	( $T_2$ )
DM	90.50	90.50	91.80	85.55	88.46
CP	4.89	3.57	21.62	12.50	12.27
EE	1.21	1.02	6.86	3.47	3.41
CF	30.18	35.41	9.54	21.95	23.50
NFE	56.02	47.82	52.86	53.82	51.17
Total ash	7.70	12.18	9.12	8.26	9.65

**Table 2 : Feed and water intake under different treatments**

Sr. No.	Parameters	$T_0$	$T_1$	$T_2$	CD
1.	Total DMI (kg)	$222.3 \pm 20.40$	$227.7 \pm 32.16$	$237.6 \pm 26.64$	NS
2.	DMI/100kg body wt.	$1.97 \pm 0.02$	$2.00 \pm 0.06$	$2.02 \pm 0.02$	NS
3.	DCP intake (g)	$399.0 \pm 0.01$	$401.0 \pm 0.01$	$430.0 \pm 0.01$	0.01
4.	TDN intake (kg)	$1.55 \pm 0.01$	$1.56 \pm 0.02$	$1.67 \pm 0.02$	0.03
5.	Water intake (kg)	$8.10 \pm 0.14$	$9.70 \pm 0.14$	$8.50 \pm 0.12$	0.38

NS=Non-significant

**Table 3 : Digestibility of nutrients under different treatments**

Sr. No.	Digestibility (%)	$T_0$	$T_1$	$T_2$	CD
1.	DM	$54.19 \pm 1.30$	$56.91 \pm 1.16$	$58.64 \pm 1.96$	NS
2.	CP	$58.11 \pm 1.31$	$56.73 \pm 1.15$	$57.24 \pm 1.37$	NS
3.	EE	$50.06 \pm 0.34$	$51.23 \pm 1.27$	$53.21 \pm 1.20$	NS
4.	CF	$57.92 \pm 1.23$	$56.64 \pm 1.20$	$58.64 \pm 1.05$	NS
5.	NFE	$55.61 \pm 1.30$	$57.81 \pm 1.17$	$56.82 \pm 1.10$	NS

NS=Non-significant

were statistically non-significant indicating that all the three treatments were at par.

The results are in accordance with the results of Parveen Kumar *et al.* (2004); Chaudhary *et al.* (2013) and Talpada *et al.* (2003).

### Conclusion :

Feeding of sorghum and wheat straw in equal proportion can be successfully used in the ration of calves

(HF X Deoni) for preparation of complete feed which found to be palatable. Feed intake and nutrient digestibility of crossbred calves fed on complete feed *i.e.* T<sub>2</sub> was higher, but all were at par.

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